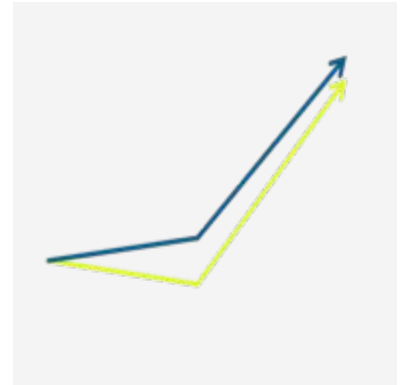


SUPERINTENDENT'S REPORT

June 2017

Newark Public Schools | www.nps.k12.nj.us



AGENDA

- **Victoria Foundation**
- **NPS Science**
 - **Science Vision**
 - **Major Investments in Partnerships**
 - **Improved Professional Development**
 - **New Middle School Curriculum Adoption**

VICTORIA FOUNDATION

VICTORIA FOUNDATION

- Founded 1924
- First major investment in Newark started in 1965
- 19-year partnership with the Newark Board of Education at Cleveland Elementary School
 - first pre-K classrooms
 - first full-day Kindergarten
 - first math-science computer lab
 - innovative partnerships with social service agencies



VICTORIA FOUNDATION

Over past 10 years, Victoria Foundation awarded \$100 million in grants, with \$40 million directly benefitting NPS students.

2016-17 Direct Grants in partnership with NPS (\$2M):

EXAMPLES

24 NPS district schools	\$630,000
NPS Higher Education Liaison	\$95,000
NPS Summer School/Arts	\$65,000
Marion Bolden Student Center	\$70,000

VICTORIA FOUNDATION

2016-17 Partnership Grants that
directly impact NPS students (\$2M):

EXAMPLES

Newark Debate Academy	\$70,000
Pathways to College	\$50,000
Liberty Science Center	\$105,000
Students 2 Science	\$140,000
New Jersey Symphony Orchestra	\$45,000

VICTORIA FOUNDATION

Special Grant

- \$1,000,000 Grant to Endow the Pi Chubb III Newark Field Trip Fund

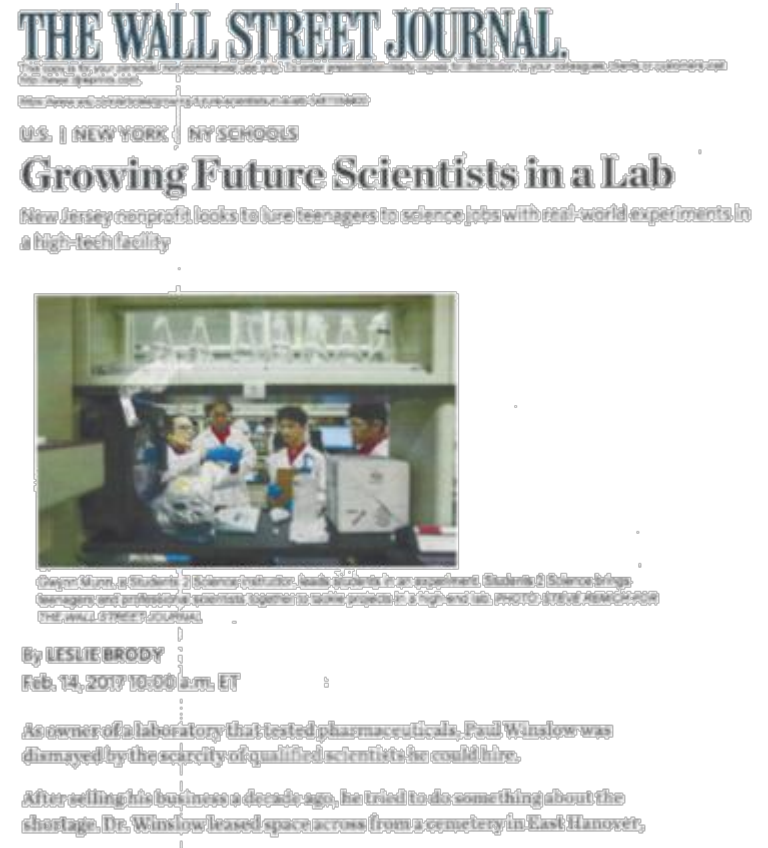


SCIENCE

INCREASED FOCUS ON SCIENCE

- Newark Public Schools is increasing our focus on science education for a few core reasons:

1. There is currently an unmet demand in Science careers in NJ and Nationally – and we intend to position our student to meet that need.
 - by 2018, the NJ will rank 12th in STEM employment in the US and will need to fill 270,000 STEM jobs
2. New state and national standards ask students to learn new and different skills in order to succeed in science
3. Newark has been on an upward trajectory in reading and mathematics – but progress in science has not yet matched this improvement.

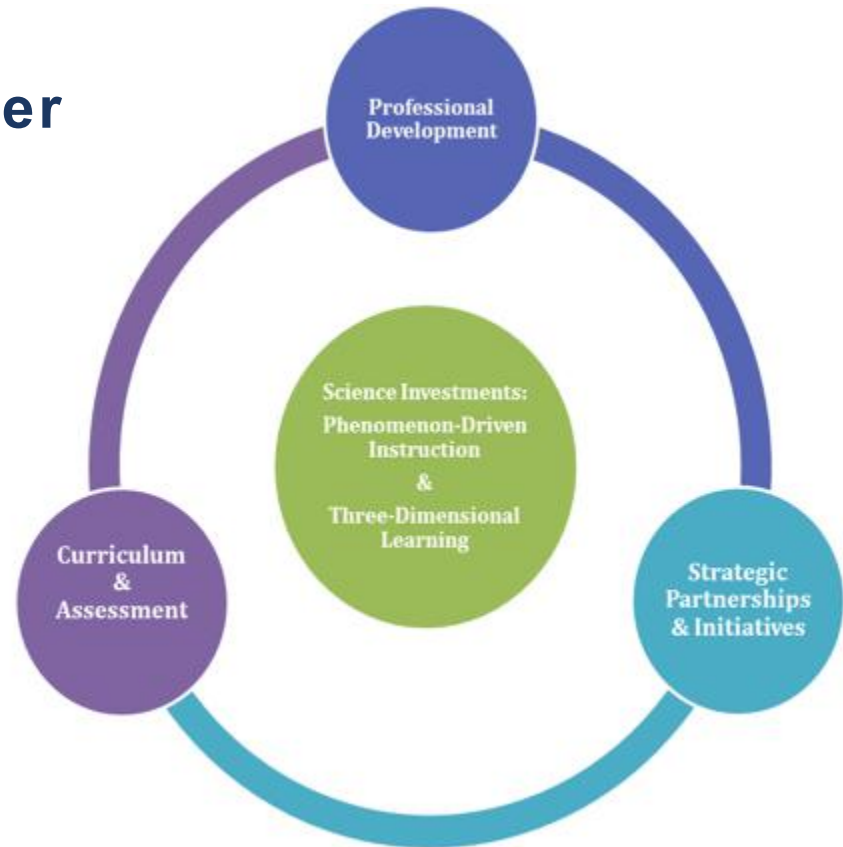


SCIENCE VISION

- Our goal is to make Newark a national leader for urban science education.

- We will get there in a few key ways:

1. Strategic Partnerships and Initiatives
2. Improved Professional Development
3. New Curriculum and Assessment

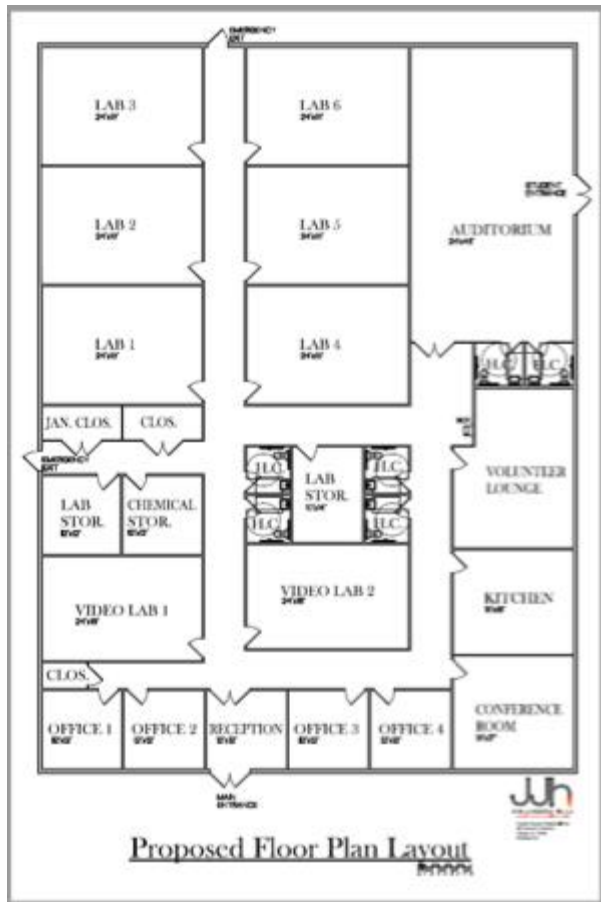


NEWARK STEM WEEK

- *Newark Public Schools (NPS) and i2 Learning launched the first-ever Newark STEM Week on Monday June 12.*
- The district's STEM Week exposed about 2,000 students across 26 Newark schools to a variety of STEM education opportunities from June 12-16.
- Students participated one of three courses, including:
 - *Kinetic Sculpture*
 - *Building a Lunar Colony*
 - *Digital Game Design*,
- Each week-long course is designed to have students solve real-world problems through activities that require hands-on experimentation and critical thinking skills.



STUDENTS 2 SCIENCE



- **Newark Public Schools is partnering with Students 2 Science** to bring a state of the art 5,000 sq. ft. science laboratory to downtown Newark where students are provided hands-on access to ~\$4MM of sophisticated equipment
- **Students will get the opportunity to work side-by-side with volunteer professional scientists** and conduct experiments designed to reinforce State and Federal core curriculum standards
- **The program will also have a virtual laboratory (v-labs)** which will allow experts to lead science experiments remotely and provide materials directly to schools so that educators can also conduct these lab sessions directly from their schools and classrooms.

STUDENTS 2 SCIENCE



ROBOTICS PROGRAMS

- NPS is partnering with FIRST® to rebuild the district's robotics program by forming new teams and supporting existing teams.
- This investment will move the district from 3 robotics teams to teams in every school in the district in 4 years.
- Next year, implementation will begin in 17 schools (11 elementary, 3 new HS, 3 existing HS)



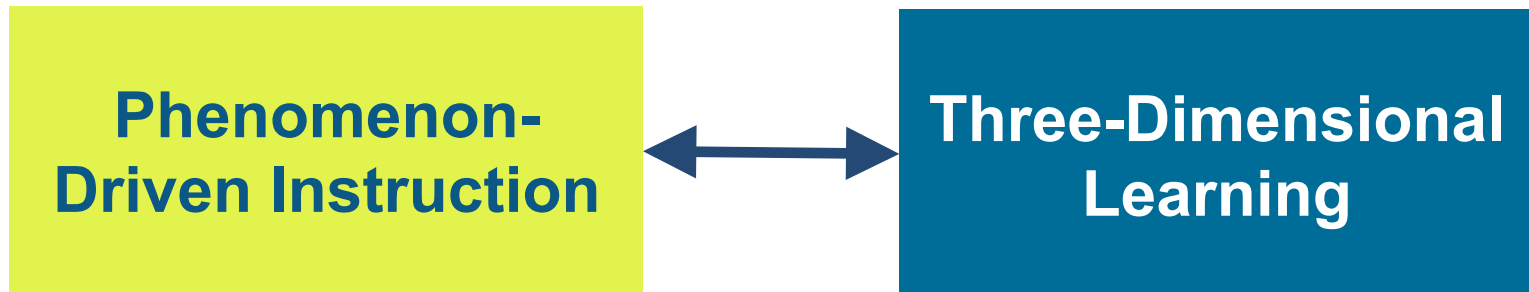
PROFESSIONAL DEVELOPMENT

- District-wide, Newark Public Schools will be providing professional development to align with new standards and partnerships.
- Partners like Students 2 Science and Newark STEM Week will provide specific Professional Development to schools to ensure educators can take advantage of resources and partnerships year-round

SCIENCE INVESTMENTS

NPS Science Investments are:

- based upon the new vision for science education set forth in ***A Framework for K-12 Science Education*** and the Next Generation Science Standards (**NGSS**).
- Centered around having students learn science in a way that is more **authentic** and **engaging**.



PHENOMENON-DRIVEN INSTRUCTION

- A foundational tenet of the NGSS is that instruction should focus on phenomena (observable events) and application of scientific knowledge to construct scientific explanations for them.



PHENOMENON-DRIVEN INSTRUCTION

What?

- Science instruction should be **anchored in phenomena** that will **spark student interest** and **motivate perseverance** to develop scientific explanations for the observed phenomena.

Why?

- The NGSS aims to draw students' attention to the the scientific principles that they experience daily, so they realize the **significance of science** and its **applications to life** outside of the classroom.

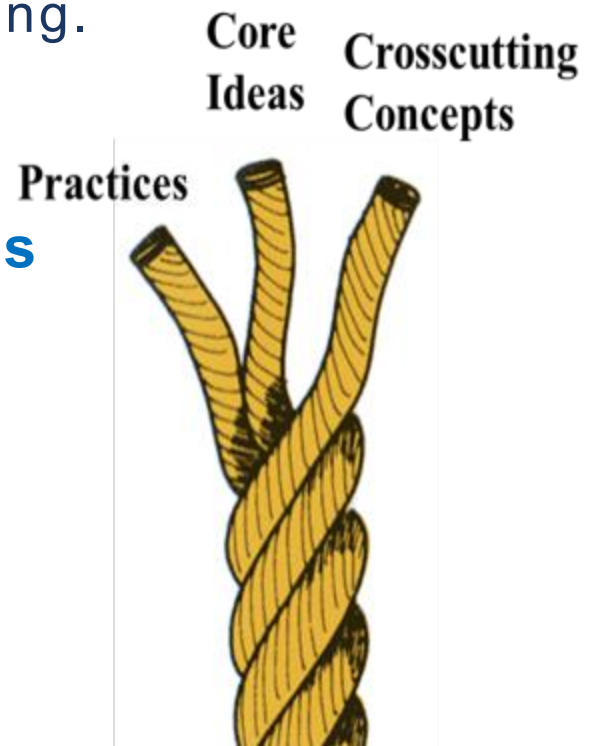
How?

- Approach and present **science in its context**, not its place within curriculum, textbooks, or standardized tests. Provide students with **rich, authentic experiences** that afford them the opportunity to work with, and as, scientists and engineers through partnerships

THREE-DIMENSIONAL LEARNING

- Another foundational tenet of the NGSS is that learning science involves more than just scientific principles, but includes skills/habits and ways of thinking.

- **Science and Engineering Practices**
- **Disciplinary Core Ideas**
- **Crosscutting Concepts**



THREE-DIMENSIONAL LEARNING

What?

- Science instruction should center around daily opportunities for students to use the **Science and Engineering Practices (SEPs)** to make sense of (figure out) **Disciplinary Core Ideas (DCIs)** through the lenses of the **Crosscutting Concepts (CCCs)**.

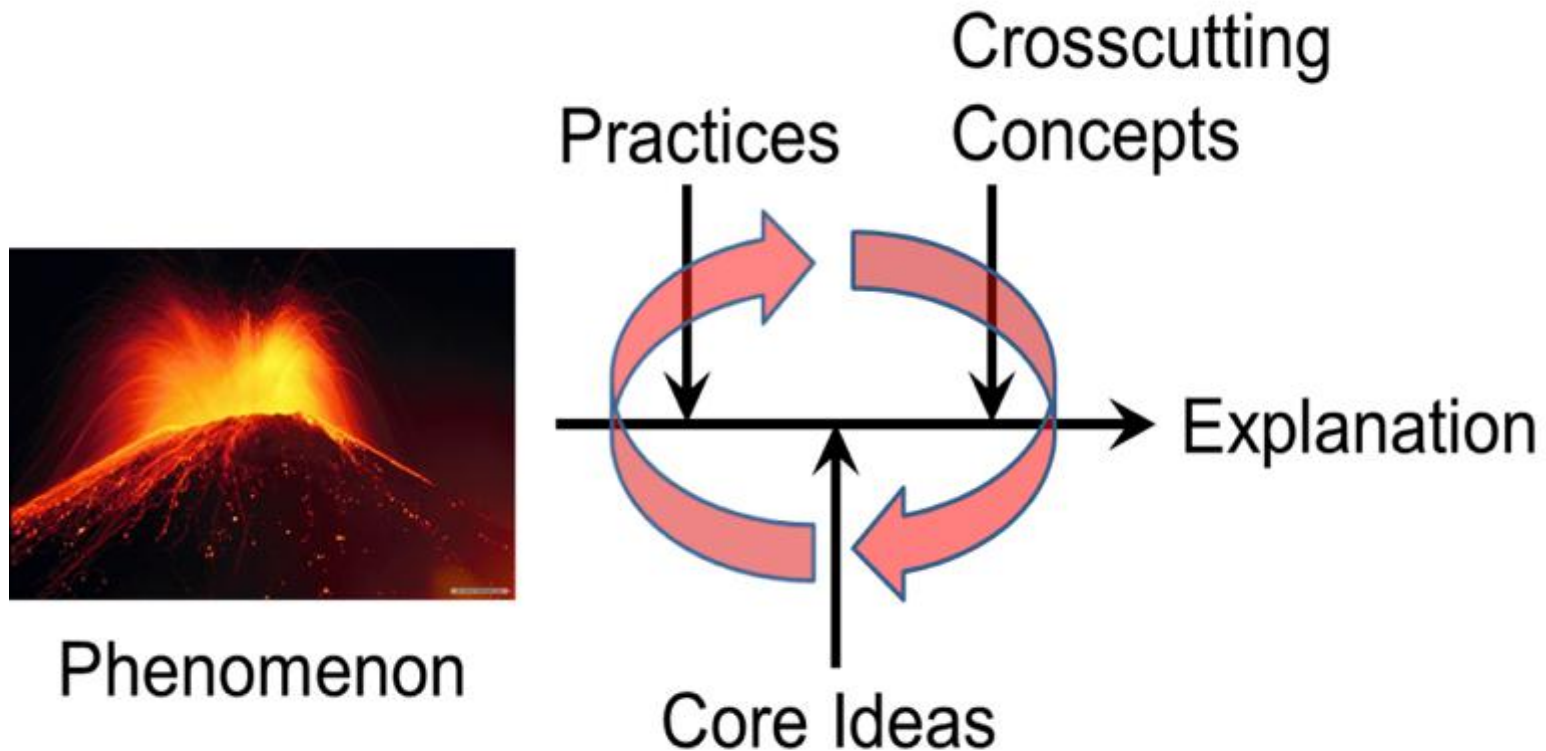
Why?

- Science, and therefore the learning of science, is **three-dimensional**; it is inclusive of SEPs, DCIs, and CCCs.

How?

- Plan with each of the dimensions of the NGSS in mind, shifting understanding of science “content” and instruction beyond that of scientific principles (i.e. DCIs), to include the **habits and methodologies** of scientists and engineers (i.e. SEPs) and the **scope and relevance** of science concepts (i.e. CCCs).

PHENOMENON-DRIVEN INSTRUCTION & THREE-DIMENSIONAL LEARNING



PHENOMENON-DRIVEN INSTRUCTION & THREE-DIMENSIONAL LEARNING



SCIENCE INVESTMENTS

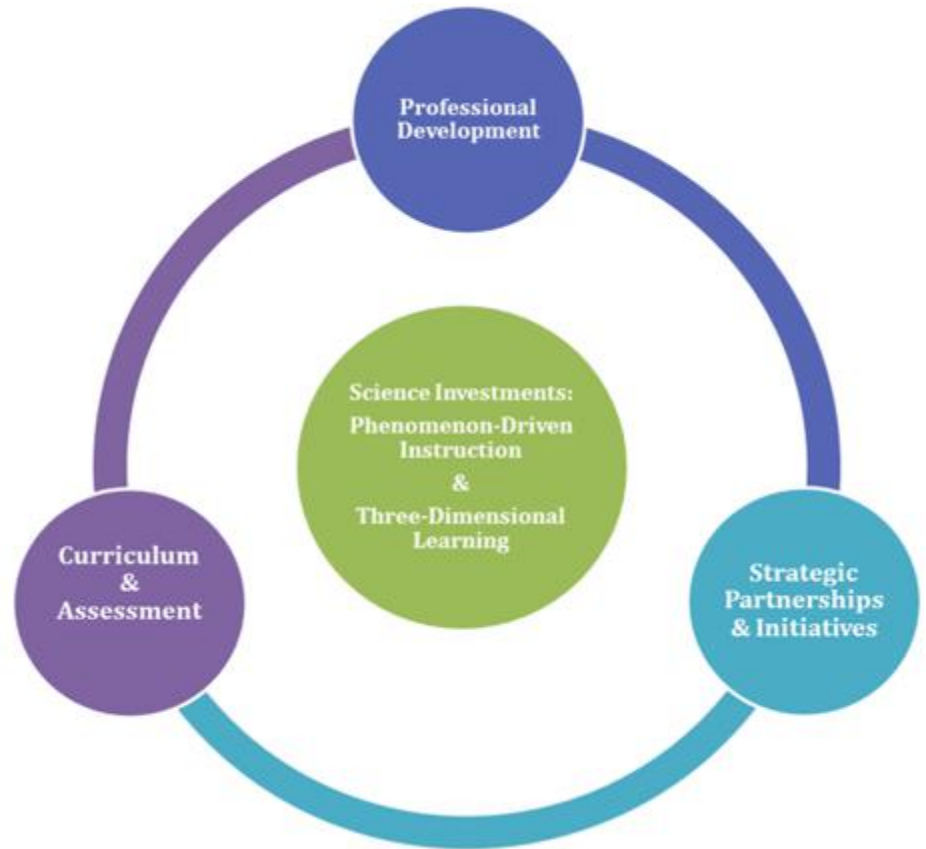
We're fully invested when **every science instructional period includes** observable evidence of :

- **Three-Dimensional Learning:**
 - What students do (**Science and Engineering Practices**)
 - What students know (**Disciplinary Core Ideas**)
 - How students think (**Crosscutting Concepts**)
- **Phenomenon-Driven Instruction:**
 - Why it matters

SCIENCE INVESTMENTS

The work to support the science investments involves three main areas:

- Strategic Partnerships & Initiatives
- Professional Development
- **Curriculum & Assessment**



STRATEGIC PARTNERSHIPS & INITIATIVES

- **Students2Science**
 - V-Labs
 - ISAAC Program Visits
- **Liberty Science Center**
 - STEM Camp
 - Afterschool STEM
 - Extended Classroom Experiences
- **i2Learning**
 - Newark STEM Week
- **Robotics Expansion (Over 4 Years)**
 - 20 First Lego League Jr. Teams
 - 20 First Lego League Teams
 - 12 First Tech Challenge Teams
 - 15 First Robotics Competition Teams

PROFESSIONAL DEVELOPMENT

■ District-Wide

- K-5 NGSS Overview Series
- K-12 Next Generation Instructional Resources Series
- PLI

■ Network-Based

- LIFTT
- VPLI

■ School-Based

- PLC/DTM

■ Program/Partner Specific

- Activate Learning PD
- Students2Science PD
- Liberty Science Center PD
- STEM Week PD

■ Regional/Statewide

- Peer Teacher Workshop Series (5 Districts)
- NGSS Assessment Program (18 Districts)
- NGSS District Partnership Program (5 Districts)

CURRICULUM & ASSESSMENT

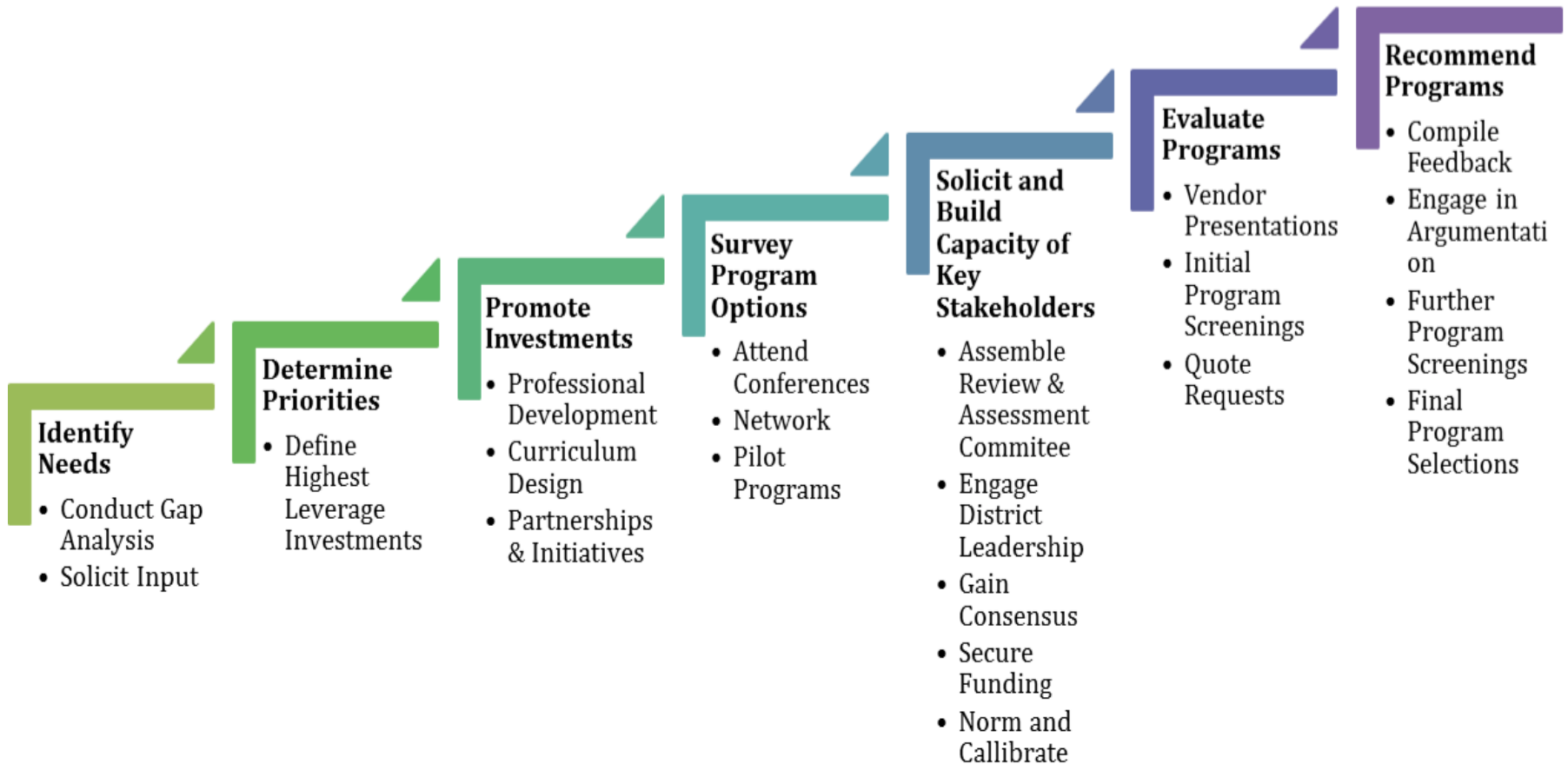
- **Updated Guidance Documents**
 - K-8
 - Biology
 - Chemistry
 - Physics
- **Curriculum Pilot Programs**
 - K-5 Active Science
 - K-5 Mystery Science
 - **6-8 IQWST (8 Schools)**
- **Assessment Program**
 - K-8 STEM Gauge (Launching 2017-2018)

CURRICULUM AND ASSESSMENT

Middle School Program Adoption:

- New curricular materials and resources are needed to **magnify current efforts** to implement the big investments of Phenomenon-Driven Instruction and Three-Dimensional Learning.
- **Middle school is the highest leverage point** for a district-wide adoption.
- An adoption will be best supported by the addition of **content-specific personnel** and policy on minimum **instructional time** for science.

STEPS TO ADOPTION

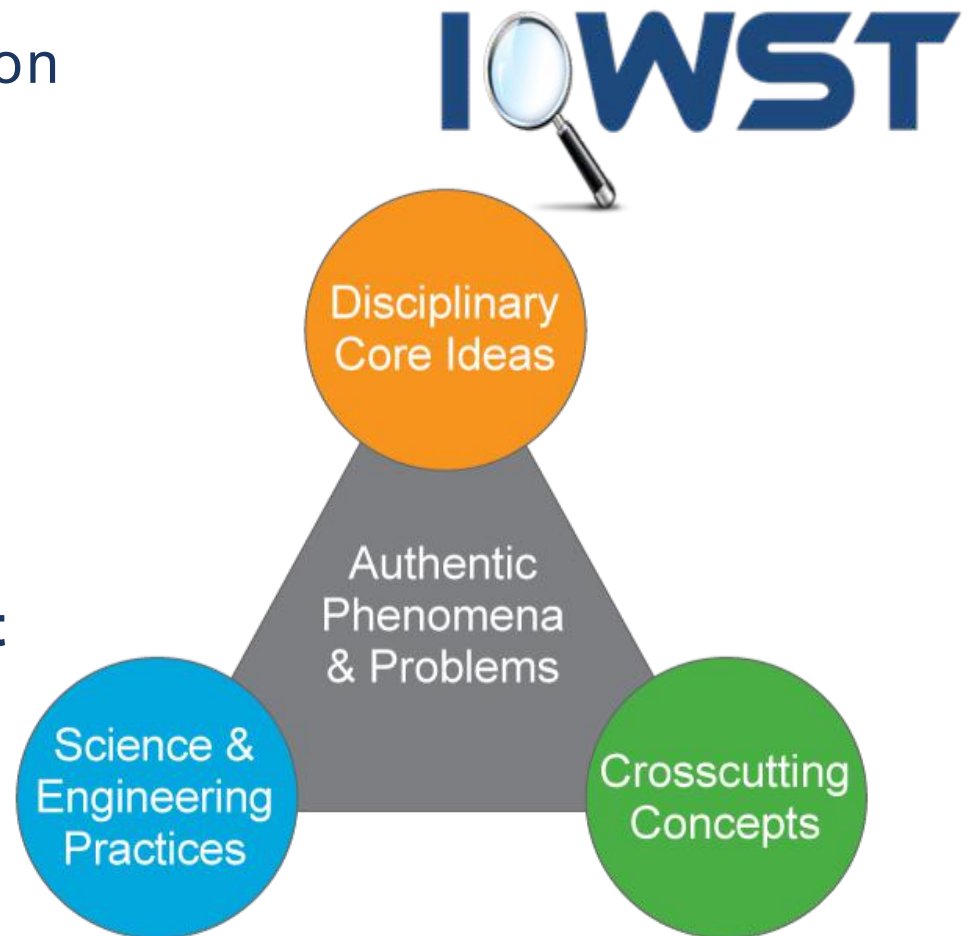


CURRICULUM REVIEW & ASSESSMENT

- A committee of teachers and administrators from NPS participated in the review and assessment of K-12 curricular program options.
 - The initial committee included 36 members
 - 26 K-8 members
 - 8 9-12 members
 - 2 K-12 members
 - There were three formal meeting sessions spanning three months
 - A total of 9 programs were presented and reviewed by the committee

INVESTIGATING AND QUESTIONING OUR WORLD THROUGH SCIENCE AND TECHNOLOGY (IQWST)

- The final recommendation is for an adoption of IQWST.
- IQWST is **phenomena-based** middle school curriculum program that integrates **the three dimensions** of the **Next Generation Science Standards**.

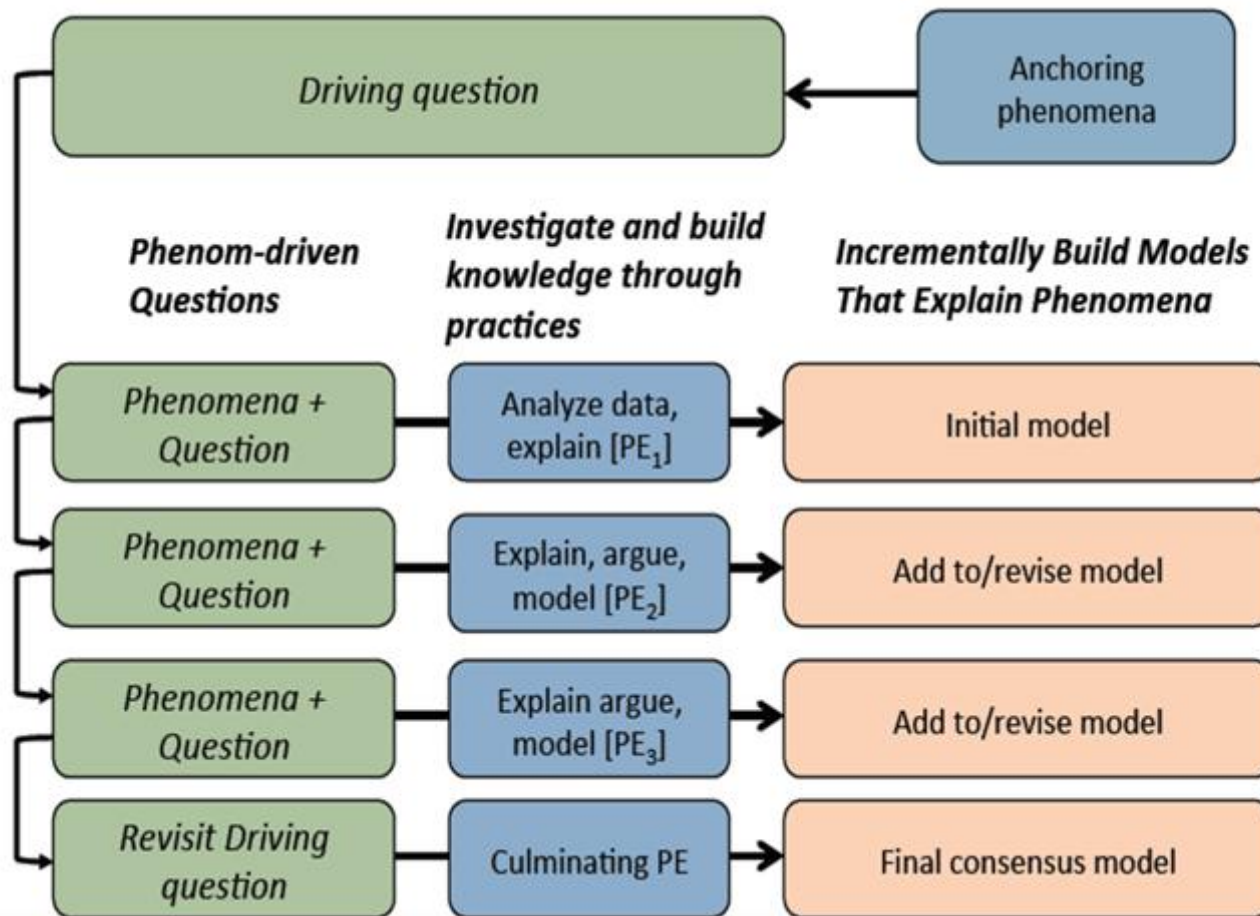


WHY IQWST?

- **Developed over 10 years by two of the top names in science education** and writers of A Framework for K-12 Science Education and the NGSS.
- **Extensively field-tested.**
- **Proven track record of success for several years in schools of varying demographics.**
 - IQWST has been piloted in Newark Public Schools for the past three years.



IQWST EXPERIENCE



C Claims are statements that answer your original question.
The claim is usually one sentence in length.
It must be concise, specific and completely answer the question.

E Evidence is all of the scientific data that supports your claim.
Your evidence must be related to your claim. Not all data is relevant evidence.
Evidence can be words, data from the lab, your own graph or other things.
It can also come from other sources like an already completed lab or a video.

R Reasoning is the explanation for why your claim is the answer that supports it.
It shows why the data you have created is evidence.
The explanation tells us a "story" of your experiment.
Claim is a detailed one-sentence answer to your question.
Reasoning should usually be at least two sentences in length.

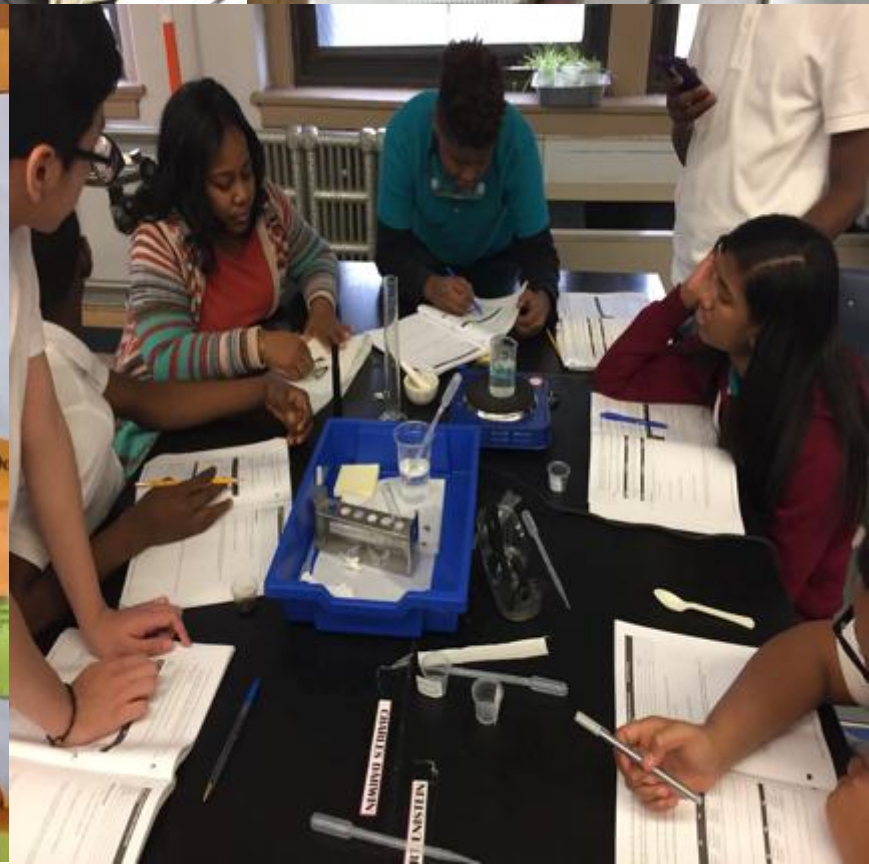
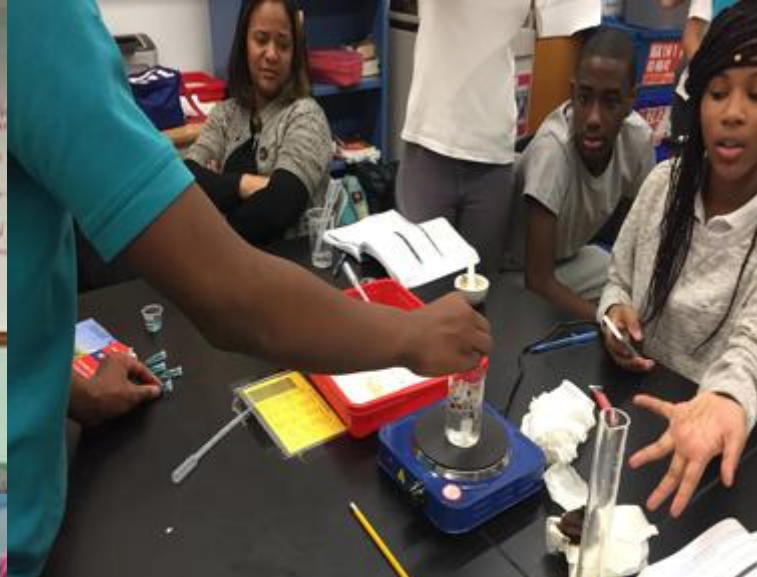
Scientific Method
You must use the scientific method at all times.

When you have your data, you will be asked to answer the question.

Scientific Method
You must use the scientific method at all times.

Scientific Method
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Scientific Method
You must use the scientific method at all times.



IQWST EXPERIENCE

- Did anyone notice a smell when you walked into the room?
 - If so:
 - Do you still smell it?
 - How strong is the odor to you? (Fist-to-Five)
 - Can you describe the smell?
 - Have you ever walked in your house and could tell what was cooking before you could see it?
 - Can you identify the source of the smell?
 - How can you tell what an smell is without seeing it?

IQWST EXPERIENCE

- Raise your hand once you can smell what is inside the jar being walked around.
 - Why did it make a difference whether the lid was on or off the jar?
 - Why could certain people smell it before others?
 - We smelled two different substances. How did two different odors get to your noses?
 - What is odor made up of so that you can smell it?

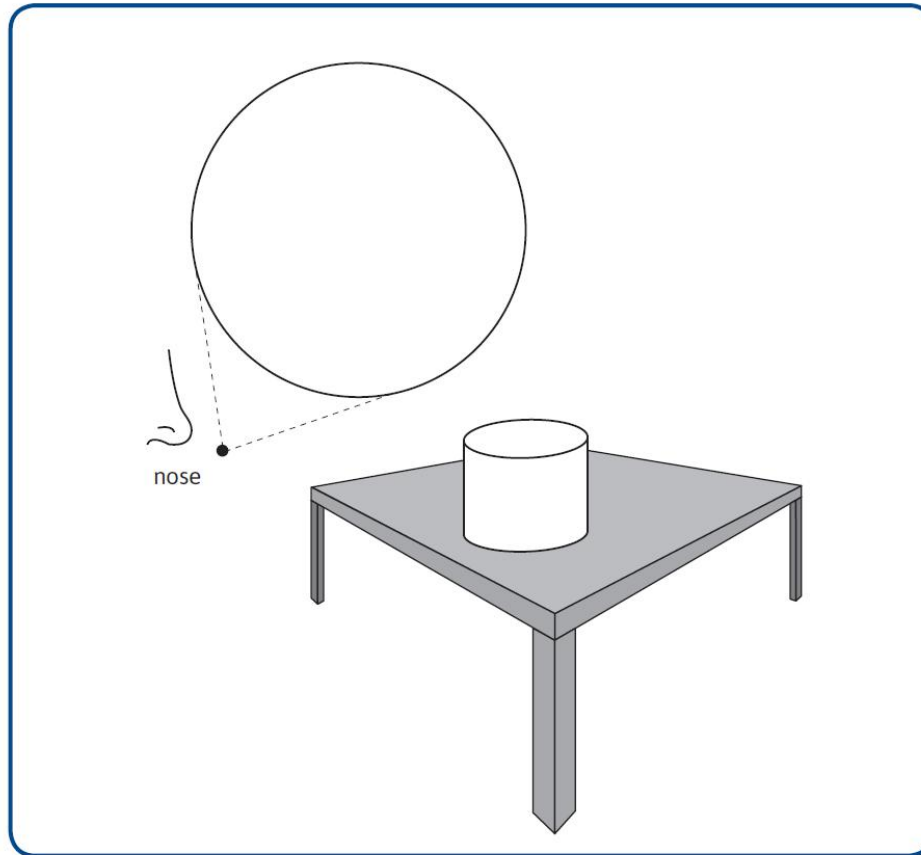
IQWST EXPERIENCE

- In order to explain phenomena, such as that odors are in the jar and then you can smell them, scientists try to picture in their heads what happens.
- Then they develop a way to show what they think is happening so they can study it.
- Scientists call what they have in their heads and the representation of the idea a model.

IQWST EXPERIENCE

- Close your eyes and picture one of the jars.
- Picture me taking the lid off of the jar.
- Picture [different people] in the room smelling the odor from the jar.
- Imagine a tiny spot in the air between the jar and your nose.
- Imagine a very special instrument that could let you zoom and see that tiny spot very close up.
- Open your eyes, and draw what you imagine you would see with that special instrument in that tiny spot between the jar and your nose.
- Describe in writing what you would see.

IQWST EXPERIENCE



IQWST EXPERIENCE

- The Driving Question for this unit is: **How Can I Smell Things from a Distance?**
- Based upon your experiences or observations generate questions you have about odors.
 - Write one question per sticky note provided.

IQWST EXPERIENCE

- When prompted, read your question(s) aloud and place them under the most appropriate sub-question on the Driving Question Board.
 - How does an odor get from the source to my nose?
 - What makes one odor different from another?
 - How can a material change so you can smell it?
- We will do investigations throughout this unit to help us figure out the answers to your questions and discover scientific principles along the way!

IQWST EXPERIENCE

We experience a **phenomenon**

Which raises a key **question**

The pursuit of which requires we use SEPs & CCC lenses


From which we develop **new Qs** and make knowledge claims



How can we smell things from a distance?

Cause & Effect

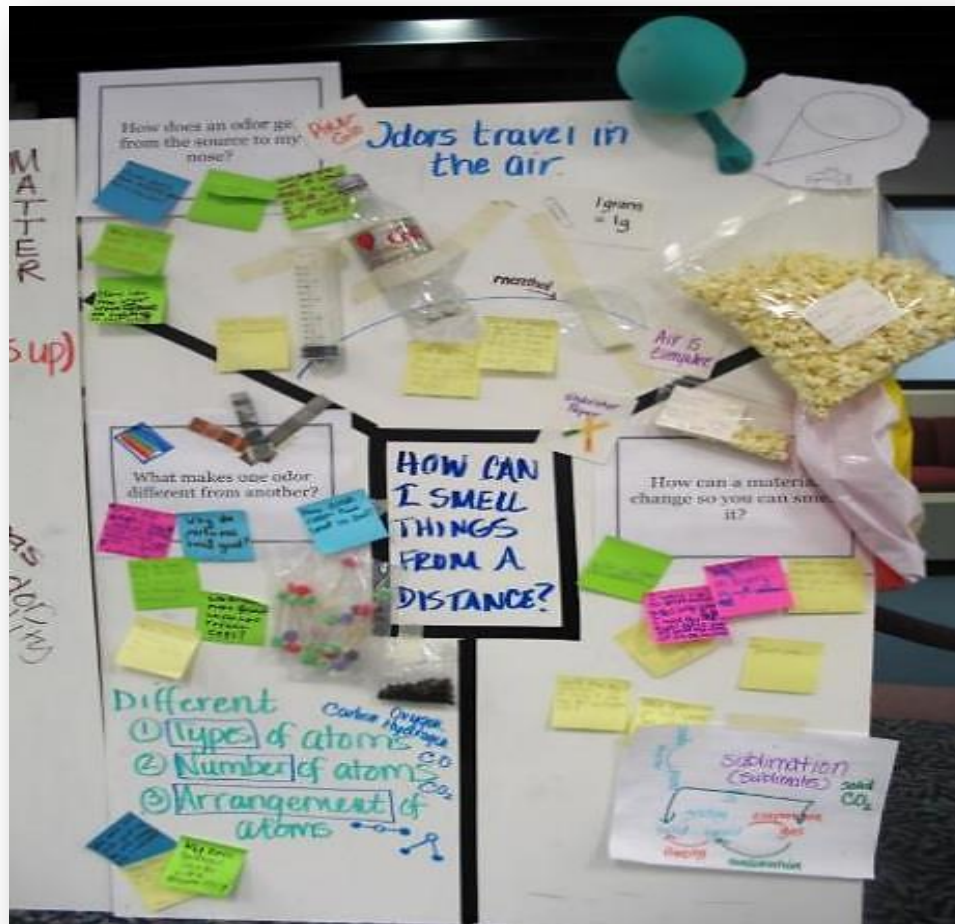


“Smellability” depends on proximity to the odor source. 

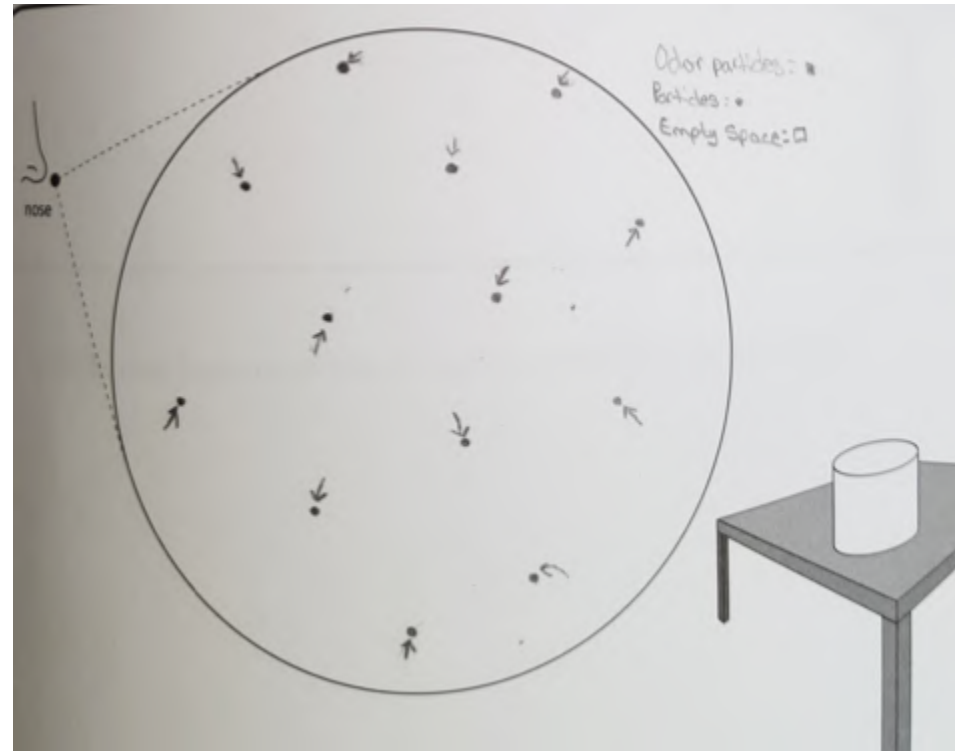
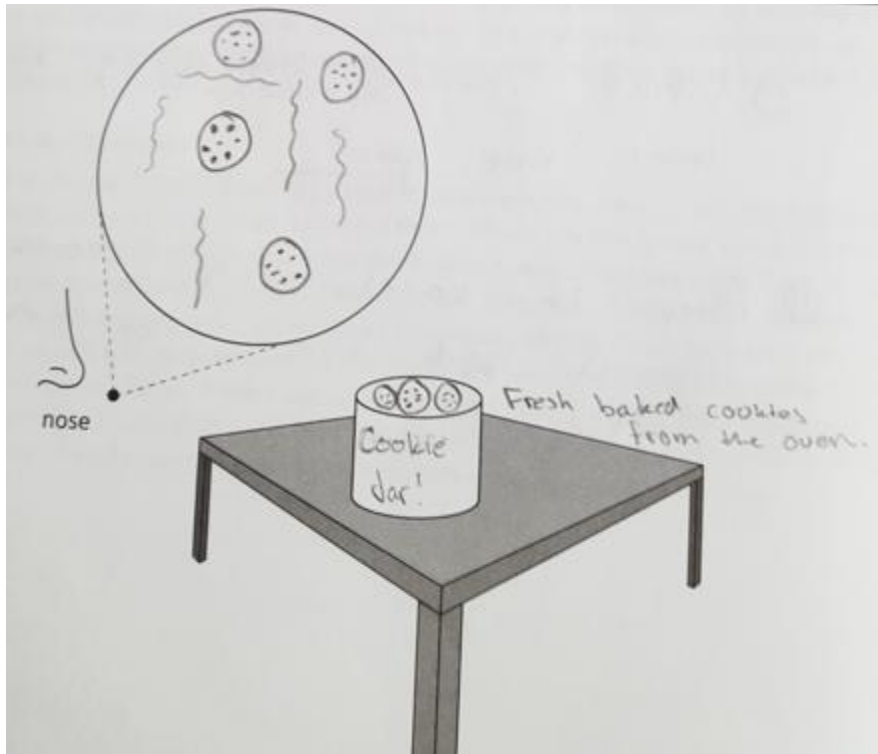
Q. Is odor a “thing?”



IQWST EXPERIENCE



IQWST EXPERIENCE



NPS TESTIMONIALS

- “I enjoyed **watching and listening** to my students engage in **scientific discussions** driven by the **natural phenomenon** presented by IQWST. The students **developed awesome questions** to further their learning around the phenomenon and investigations. The students engaged in the 3 strands of the NGSS: DCIs, Science and Engineering Practices, and Crosscutting Concepts. My class was full of **critical thinkers** who were able to **construct the scientific principles on their own** to add to the Driving Question Board!”

6th Grade Teacher

QUESTIONS & COMMENTS

THANK YOU